# Ten Plus One Strategies for Enhancing Depth and Complexity of Math Tasks 

## Examples by Strategy

by Jerry Burkhart

## Strategy 1: Write a story.

Grade 1
Original task: $36+7$
New Task: Write and answer a story problem for $36+7$.
New Task +: Write and answer a story problem for $36+27$.
Grade 2
Original task: 35-18
New Task: Write and answer a story problem for $35-18$.
New Task +: Write and answer a story problem for $35-18+11$.
Grade 3
Original task: $10 \times 37$
New Task: Write and answer a real-world story problem for $10 \times 37$.
New Task +: Write and answer a real-world story problem for $12 \times 37$.
Grade 4
Original task: $352 \div 6$
New Task: Write and answer a real-world story problem for $362 \div 6$.
New Task + : Write and answer a real-world story problem for $362 \div(6 \times 2)$.
Grade 5
Original task: Write $>,<$, or $=.0 .7$ $\qquad$ 0.58

New Task: Write a real-world story about comparing 0.7 and 0.58 .
New Task + : Write a real-world story about comparing $0.07,0.058$, and 0.12 .
Grade 6
Original task: $6 \div \frac{2}{3}$
New Task: Write and answer a real-world story problem for $6 \div \frac{2}{3}$.
New Task + : Write and answer a real-world story problem for $6 \div \frac{4}{5}$.

## Grade 7

Original task: 13--5
New Task: Write and answer a real-world story problem for 13--5.
New Task +: Write and answer two real-world story problems for 13--5. Use a different meaning of subtraction and a different real-world situation for each story.
Grade 8
Original task: Find the slope of the line.


New Task: Write a real-world story about the line (above) and its slope. Tell what $x, y$, and the slope represent.
New Task +: Write a real-world story about the line (below) and its slope. Tell what $x, y$, and the slope represent.


## Strategy 2: Draw a picture.

## Grade 1

Original task: $7+4=6+5$
New Task: Draw a picture or diagram to show that $7+4$ is equal to $6+5$.
New Task + : Draw a picture or diagram to show that $7+4+9$ is equal to $9+6+5$.
Grade 2
Original task: Name the shape.


New Task: Draw a pentagon whose sides are all different lengths.
New Task +: Draw five hexagons, and make each one as different as you can.

## Grade 3

Original task: Fill in the box to make the fractions equivalent. $\frac{2}{3} \frac{6}{\square}$
New Task: Draw a diagram to show that $\frac{2}{3}$ and $\frac{6}{9}$ are equivalent.
New Task + : Draw a diagram to show that $\frac{6}{8}$ is equivalent to $\frac{9}{12}$.
Grade 4
Original task: $362 \div 6$
New Task: Draw a diagram showing the meaning and the value of $362 \div 6$.
New Task + : Draw diagrams showing two meanings and the value of $362 \div 6$.
Grade 5
Original task: $6 \cdot \frac{2}{3}$
New Task: Draw a diagram showing the meaning and the value of $6 \cdot \frac{2}{3}$.
New Task + : Draw diagrams showing two meanings and the value of $6 \cdot \frac{2}{3}$ (or $5 \cdot \frac{2}{3}$ ).
Grade 6
Original task: $6 \div \frac{2}{3}$
New Task: Draw a diagram showing the meaning and the value of $6 \div \frac{2}{3}$.
New Task + : Draw diagrams showing two meanings and the value of $6 \div \frac{2}{3}$ (or $6 \div \frac{4}{5}$ ).
Grade 7
Original task: 13--5
New Task: Draw a diagram showing the meaning and the value of $13-5$.
New Task +: Draw two models that show different ways to understand the meaning of $13--5$ and how to find its value.
Grade 8
Original task: Find the length of the hypotenuse of a right triangle with legs of 4 and 10 units.
New Task: On graph paper, draw a right triangle with legs of 4 units and 10 units.
Draw a square on the hypotenuse and use it to find the length of the hypotenuse.
New Task +: New Task: On graph paper, draw a right triangle with legs of 4 units and 10.5 units. Draw a square on the hypotenuse and use it to find the length of the hypotenuse.

## Strategy 3: Explain why.

## Grade 1

Original task: True or False: $7+4=6+5$
New Task: Explain why $7+4=6+5$ without finding the sums.
New Task + : Explain why $7+4+9$ is equal to $9+6+5$ without find the sums.
Grade 2
Original task: Write $<,>$, or $=.302$ $\qquad$ 297
New Task: Explain why $302>297$.
New Task +: ---
Grade 3
Original task: $10 \times 37$
New Task: Explain why the product of $10 \times 37$ looks like 37 followed by 0 .
New Task +: Explain why the product of $100 \times 37$ looks like 37 followed by two 0 s. places.
Grade 4
Original task: $\frac{5}{8}-\frac{1}{4}$
New Task: Explain why $\frac{5}{8}-\frac{1}{4} \neq \frac{5-1}{8-4}$.
New Task + : Explain why $\frac{7}{12}-\frac{4}{8} \neq \frac{7-4}{12-8}$.
Grade 5
Original task: $6 \cdot \frac{2}{3}$
New Task: Explain why $6 \cdot \frac{2}{3}=4$.
New Task + : Explain why $6 \cdot \frac{3}{4}=4 \frac{1}{2}$.
Grade 6
Original task: $6 \div \frac{2}{3}$
New Task: Explain why $6 \div \frac{2}{3}=9$.
New Task + : Explain why $6 \div \frac{4}{5}=7 \frac{1}{2}$.
Grade 7
Original task: 13 --5
New Task: Explain why $13--5$ is greater than 13 .
New Task + : Explain why $-13--5-6$ is one less than -13 .
Grade 8
Original task: Decide if each number is rational or irrational:

$$
\begin{array}{lllllll}
\frac{3}{4} & \sqrt{10} & \frac{2.3}{0.8} & \pi & 0 & -6 & 2 \cdot \sqrt{9}
\end{array}
$$

New Task: Explain why $\frac{2.3}{0.8}$ is a rational number.
New Task + : Explain why $\frac{2.3-\frac{3}{4}}{0.8}$ is a rational number.

## Strategy 4: Find another way.

## Grade 1

Original task: $36+7$
New Task: Find another way to calculate $36+7$.
New Task + : Find three ways to calculate $36+27$.
Grade 2
Original task: 35-18
New Task: Find another way to calculate $35-18$.
New Task + : Find three strategies for calculating $35-18+11$.
Grade 3
Original task: $10 \times 37$
New Task: Find another way to calculate $10 \times 37$.
New Task + : Find three strategies for calculating $10 \times 37$ (or $12 \times 37$ ).
Grade 4
Original task: $362 \div 6$
New Task: Find another way to calculate $362 \div 6$.
New Task + : Find three strategies for calculating $362 \div 6$ (or $3630 \div 20$ ).
Grade 5
Original task: 8.4 • 1000
New Task: Find another way to calculate $8.4 \cdot 1000$.
New Task +: Find at least three strategies for calculating $0.84 \cdot 100,000$.
Grade 6
Original task: 18 is what percent of 40 ?
New Task: Find another way to determine what percent 18 is of 40 .
New Task +: Find at least three strategies to determine what percent 18 is of 40 (or 44 ).
Grade 7
Original task: A shirt that costs 16.50 is on sale for $20 \%$ off. What is the sale price?
New Task: Find another strategy to calculate the sale price.
New Task +: Find at least two strategies to calculate the overall percent reduction if the price is reduced by $20 \%$, and then another $20 \%$ of that.
Grade 8
Original task: Find the slope of the line.


New Task: Use another strategy to find the slope of the line.
New Task +: Show at least two strategies to find the slope of this line.


## Strategy 5: Compare and contrast.

## Grade 1

Original task: True or False: $7+4=6+5$
New Task: How are these number sentences the same? How are they different?

$$
6+5 \quad 7+4 \quad 8+3 \quad 9+2
$$

New Task + : How are these number sentences the same? How are they different?

$$
23+41 \quad 21+43 \quad 19+45 \quad 17+47
$$

Grade 2
Original task: Does the shaded part show a half, a third, or a fourth?


New Task: What do the first three pictures have in common? What do they all have in common?


New Task +: What do all of these pictures have in common?


Grade 3
Original task: Find the area.


New Task: What do all of these polygons have in common?


New Task + : What do all of these polygons have in common?


Grade 4
Original task: Find the factors of 42.
New Task: How are the two sets of numbers different? (Think about multiplication.) First set: $18,42,6,35,27 \quad$ Second set: 7, 2, 11, 19, 5
New Task + : How are the two sets of numbers different? (Think about multiplication.)
First set: 10, 143, 8, 22, 6, 77, $95 \quad$ Second set: 97, 13, 2, 23, 49, 109, 4

## Strategy 5: Compare and contrast. (part 2)

Grade 5
Original task: $6 \cdot \frac{2}{3}$
New Task: Compare and contrast the first set of expressions to the second.
Set 1: $9 \cdot \frac{2}{3} \quad 12 \cdot \frac{5}{6} \quad 15 \cdot \frac{2}{5}$
Set 2: $6 \cdot \frac{3}{5} \quad 7 \cdot \frac{1}{2} \quad 12 \cdot \frac{2}{7}$

New Task +: ---
Grade 6
Original task: Find the area of the parallelogram.


New Task: Compare and contrast the parallelograms.


New Task + : Compare and contrast the parallelograms.


Grade 7
Original task: Find the measure of $\angle x$.


New Task: Compare and contrast the marked angles in the two pictures.


New Task + : Compare and contrast the marked and other angles in the three pictures.


Grade 8
Original task: Find the slope of the line.
New Task: Compare and contrast the slopes of the four lines.


New Task +: ---

## Strategy 6: Start with the answer.

## Grade 1

Original task: $36+7$
New Task: The answer is 43 . What two numbers were added?
New Task +: The answer is 43 . What three numbers were added?

## Grade 2

Original task: Does the shaded part show a half, a third, or a fourth?


New Task: The shaded part of a picture shows a third. What does the picture look like?
New Task +: The shaded part of a picture shows a third. Show at least four examples of the picture. Make each picture as different as you can.
Grade 3
Original task: Find the area.


New Task: The area of a polygon in 4 square units. Draw the polygon.
New Task +: The area of a polygon is 4 square units. Draw at least four examples of the polygon.
Make each drawing as different as you can.
Grade 4
Original task: $352 \div 7$
New Task: The quotient is 50 and the remainder is 2 . What are the dividend and divisor?
New Task +: The quotient is 50 and the remainder is 2 . Show at least four examples of numbers of possible dividends and divisors.
Grade 5
Original task:
New Task: The volume of a rectangular prism is 336 (or 338 ) cubic cm . Draw a picture of the prism.
New Task +: The volume of a rectangular prism is 336 (or 338) cubic cm. Draw at least four pictures of what the prism could look like.
Grade 6
Original task:
New Task: The mean of five numbers is 36.8 , the median is 32 , and the range is 38 . What are the numbers?
New Task +: The mean of ten numbers is 36.8 , the median is 32 , and the range is 38 . Show at least five examples of possible sets of numbers.

IN PROGRESS:
Grade 7
Original task:
New Task:
Grade 8
Original task:
New Task:

## Strategy 7: Remove information.

## Grade 1

Original task: $36+7$
New Task:
Grade 2
Original task: 35-18
New Task:
Grade 3
Original task:
New Task:

Grade 4
Original task:
New Task:

## Grade 5

Original task:
New Task:

Grade 6
Original task:
New Task:

## Grade 7

Original task:
New Task:
Grade 8
Original task:
New Task:

## Strategy 8: Solve to learn.

## Grade 1

Original task: Write the number that is ten less than 83.
New Task:
Grade 2
Original task: 35-18
New Task:

Grade 3
Original task:
New Task:
Grade 4
Original task:
New Task:

## Grade 5

Original task:
New Task:

Grade 6
Original task:
New Task:
Grade 7
Original task:
New Task:

Grade 8
Original task:
New Task:

## Strategy 9: Build a pattern.

## Grade 1

Original task: True or False: $7+4=6+5$
New Task:
Grade 2
Original task: 35-18
New Task:

Grade 3
Original task:
New Task:
Grade 4
Original task:
New Task:
Grade 5
Original task:
New Task:

Grade 6
Original task:
New Task:

## Grade 7

Original task:
New Task:
Grade 8
Original task:
New Task:

## Strategy 10: Ask "What if...?"

## Grade 1

Original task: Which segment is longer?
New Task:
Grade 2
Original task: Write $>,<$ or $=.302$ 297
New Task:
Grade 3
Original task:
New Task:

Grade 4
Original task:
New Task:

## Grade 5

Original task:
New Task:

Grade 6
Original task:
New Task:

## Grade 7

Original task:
New Task:
Grade 8
Original task:
New Task:

